COMPUTERS & EDUCATION

An International Journal

Editors:
Rachelle S. Heller The George Washington University
Jean D. M. Underwood The Nottingham Trent University

Volume Contents and Author Index

VOLUME 31

1998

PERGAMON

COMPUTERS & EDUCATION

EDITORS

Professor RACHELLE S. HELLER
Department of Electrical Engineering
and Computer Science
The George Washington University
Washington, DC 20052, U.S.A.
Fax: +1 202 994 0227
e-mail: sheller@seas.gwu.edu

Professor JEAN D. M. UNDERWOOD
Department of Social Sciences
Division of Psychology
The Nottingham Trent University
Burton Street
Nottingham NG1 4BU, U.K.
e-mail: com&ed@ntu.ac.uk
jean.underwood@ntu.ac.uk

EDITORIAL ADVISORY BOARD

A. A. Pouring, U.S.A. (Founder Editor)
D. F. Rogers, U.S.A. (Founder Editor)
P. R. Smith*, U.K. (Founder Editor)

A. Bartlomé, Spain
J. Chew, Singapore
D. Clements, U.S.A.
B. Collis, The Netherlands
T. Downes, Australia
J. Gal-Ezer, Israel
M. Gigante, Australia
J. R. Hartley, U.K.
B. Kurshan, U.S.A.
E. Lehtinen, Finland
T. Plomp, The Netherlands
T. Sakamoto, Japan
I. Sanders, South Africa
P. Scrimshaw, U.K.
D. Squires, U.K.
W. Tagg, U.K.
D. J. Thompson, U.S.A.

European Book Review Editor: Professor David Hawkridge, Institute of Educational Technology, The Open University, Milton Keynes MK7 6AA, U.K.

U.S. Book Review Editor: Professor Joyce Little, Department of Computer and Information Sciences, Towson State University, Baltimore, MD 21204, U.S.A.

Author Service Department: For queries relating to the general submission of articles (including electronic text and artwork) and the status of accepted manuscripts, please contact the Author Service Department: e-mail: authors@elsevier.co.uk; Fax: +44 (0) 1865 843905; Tel.: +44 (0) 1865 843900.

Publishing Office: Elsevier Science Ltd, Bampfylde Street, Exeter EX1 2AH, U.K. [*Tel.: Exeter (01392) 251558; Fax: (01392) 425370*]

Subscription Rates

Annual Institutional Subscription Rates 1999: Europe, The CIS and Japan NLG 1976.00; all other countries US$1003.00. Associated Personal Subscription rates are available on request for those whose institutions are library subscribers. Dutch Guilder prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

Advertising orders and enquiries can be sent to: **USA, Canada and South America**: Mr Tino DeCarlo, The Advertising Department, Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010-5107, USA; phone: (+1) (212) 633 3815; fax: (+1) (212) 633 3820; e-mail: t.decarlo@elsevier.com. **Japan**: The Advertising Department, Elsevier Science K.K., 9-15 Higashi-Azabu 1-chome, Minato-ku, Tokyo 106, Japan; phone: (+81) (3) 5561 5033; fax: (+81) (3) 5561 5047. **Europe and ROW**: Rachel Gresle-Farthing, The Advertising Department, Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK; phone: (+44) (1865) 843565; fax: (+44) (1865) 843976; e-mail: r.gresle-farthing@elsevier.co.uk

Back Issues

Back issues of all previously published volumes are available direct from Elsevier Science Offices (Oxford and New York). Complete volumes and single issues can be purchased for 1992–1997. Earlier issues are available in high quality photo-duplicated copies as complete volumes only.

Published 8 issues/annum (2 volumes) in January, February, April, May, August, September, November, December

Copyright © 1998 Elsevier Science Ltd

PERIODICALS POSTAGE PAID AT RAHWAY, NJ. *Computers & Education* (ISSN 0360-1315) is published 8 issues per year in January, February, April, May, August, September, November and December, by Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. The annual subscription in the U.S.A. is $1003.00. *Computers & Education* is distributed by Mercury Airfreight International Ltd, 365 Blair Road, Avenel, NJ 07001, U.S.A. POSTMASTER: Please send address corrections to *Computers & Education*, c/o Elsevier Science Regional Sales Office, Customer Support Department, 655 Avenue of the Americas, New York, NY 10010, U.S.A.

CONTENTS

Number 1

Marja Kuittinen	1	Criteria for evaluating CAI applications
Liam Murray	17	CALL and Web training with teacher self-empowerment: a departmental and long-term approach
Ben Shneiderman	25	Relate–Create–Donate: a teaching/learning philosophy for the cyber-generation
Gabriel Jacobs and Catherine Rodgers	41	ISDN-based distance learning: tangible costs, intangible benefits
Kuo-En Chang, Mei-Ling Lin and Sei-Wang Chen	55	Application of the Socratic dialogue on corrective learning of subtraction
M. Hill, J. D. Bailey and P. A. S. Reed	69	Hypermedia systems for improving knowledge, understanding and skills in engineering degree courses
J. Geller and R. Dios	89	A low-tech, hands-on approach to teaching sorting algorithms to working students
R. Nkambou, C. Frasson and G. Gauthier	105	A new approach to *ITS-curriculum and course authoring: the authoring environment*
	131	Book Reviews

Number 2

Philip Machanick	135	The abstraction-first approach to data abstraction and algorithms
Gayle Calverley, David Fincham and Dick Bacon	151	Modernisation of a traditional physics course
Melanie Ward and David Newlands	171	Use of the Web in undergraduate teaching
G. Russell	185	Elements and implications of a hypertext pedagogy
Kuo-En Chang, Sei-Hua Liu and Sei-Wang Chen	195	A testing system for diagnosing misconceptions in DC electric circuits
Neil Selwyn	211	The effect of using a home computer on students' educational use of IT

D. Laurillard 229 Multimedia and the learner's experience of narrative

243 Book Reviews

Number 3

David R. McIntyre and Francis G. Wolff 255 An experiment with WWW interactive learning in university education

Rénette J. Blignaut and Isabella M. Venter 265 Teamwork: can it equip university science students with more than rigid subject knowledge?

G. Frosini, B. Lazzerini and F. Marcelloni 281 Performing automatic exams

D. G. Dewhurst and A. D. Williams 301 An investigation of the potential for a computer-based tutorial program covering the cardio-vascular system to replace traditional lectures

Janet A. Taylor 319 Self Test: a flexible self assessment package for distance and other learners

John Trushell, Ann Slater, Raymonde Sneddon and Helen Mitchell 329 Insights into ICT capability on a teacher-mentored PGCE course

349 Book Review

Number 4

Glenn L. DeVoogd 351 Computer use levers power sharing: multicultural students' styles of participation and knowledge

Ab. Rahim bin Bakar and Shamsiah Mohamed 365 Preparing Malaysian vocational and technology teachers to integrate computer technology in teaching vocational and technology subjects

Betty Collis 373 New didactics for university instruction: why and how?

Neil C. Rowe and Sandra Schiavo 395 An intelligent tutor for intrusion detection on computer systems

Maria Kordaki and Despina Potari 405 A learning environment for the conservation of area and its measurement: a computer micro-world

423 Book Reviews

429 Volume Contents and Author Index